Influence of weight, body mass index and lifestyle factors on radiographic features of lumbar disc degeneration

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Intervertebral disc degeneration is characterised radiologically by the presence of osteophytes, disc space narrowing and endplate sclerosis. Various lifestyle factors including occupational and recreational physical activity, obesity and smoking have been reported to be associated with the occurrence of lumbar disc disease, although the results from studies are not always consistent, with few studies looking at associations with the component radiographic features of the disease.[1–9] We studied a population-based sample of men and women to determine the association between weight, body mass index (BMI), regular levels of physical activity, smoking and radiographic features of lumbar disc degeneration.

Men and women aged ⩾50 years were recruited for participation in a screening survey of vertebral osteoporosis (European Vertebral Osteoporosis Study) in Aberdeen, UK. The sampling frame was a community health index based on primary-care registrants. Subjects were invited to attend for an interviewer-administered questionnaire and lateral spine radiographs. Height and weight were also assessed. Vertebral disc spaces from L1/2 to L4/5 were assessed by a single observer for anterior osteophytes, endplate sclerosis and disc space narrowing (each graded 0–3).[10] For each feature, a total score was calculated by summing the grades across vertebral levels (range 0–12). Linear regression was used to determine the association between the total score for each of the radiographic features and the putative risk factors, with the radiographic feature as the dependent variable, results being expressed as β coefficients and 95% confidence intervals (CIs). All individuals gave written informed consent to take part in the study, which also received the approval of the local ethics committee.

A total of 286 men (mean (standard deviation (SD) age 65.3 (8.9) years) and 299 women (mean (SD) age 65.2 (8.9) years) were included in the analysis. The median (interquartile range) score for osteophytes was 4 (2, 5), endplate sclerosis 1 (0, 2) and disc space narrowing 1 (0, 3). After adjustment for age and sex, compared with those in the lowest tertile, those in the middle and upper tertiles of body weight had a higher total osteophyte score (table 1). Small positive associations were seen between weight and BMI and the scores for the other radiographic features although CIs around most estimates included unity. There was no association between any of the total scores and regular physical activity levels or smoking.

Table 1 Influence of weight, BMI, physical activity and smoking on individual radiographic features of lumbar disc degeneration

	Osteophytes*	Sclerosis*	Narrowing*
	β coefficient† (95% CI)	β coefficient† (95% CI)	β coefficient† (95% CI)
Tertiles of weight (kg)			
Lower	Referent	Referent	Referent
Mid	0.5 (0.1 to 1.0)	0.1 (–0.2 to 0.4)	0.1 (–0.4 to 0.6)
Upper	0.5 (0 to 0.9)	0.2 (–0.1 to 0.5)	0.2 (–0.3 to 0.7)
Tertiles of BMI (kg/m^2)			
Lower	Referent	Referent	Referent
Mid	0.4 (–0.1 to 0.8)	0.4 (0.1 to 0.7)	0.2 (–0.3 to 0.7)
Upper	0.4 (–0.1 to 0.8)	0.1 (–0.2 to 0.5)	0.0 (–0.5 to 0.5)
Activity‡ (age 15–25 years)			
Light/moderate	Referent	Referent	Referent
Heavy/very heavy	0 (–0.4 to 0.4)	–0.1 (–0.4 to 0.2)	–0.3 (–0.7 to 0.1)
Activity‡ (age 25–50 years)			
Light/moderate	Referent	Referent	Referent
Heavy/very heavy	0.1 (–0.3 to 0.4)	0 (–0.3 to 0.2)	–0.2 (–0.6 to 0.2)
Activity‡ (age⩾50 years)			
Light/moderate	Referent	Referent	Referent
Heavy/very heavy	0.3 (–0.2 to 0.7)	0.1 (–0.2 to 0.4)	–0.1 (–0.6 to 0.3)
Walking or cycling§			
<1/2 h	Referent	Referent	Referent
⩾1/2 h	0 (–0.5 to 0.5)	0.3 (–0.1 to 0.6)	0.2 (–0.3 to 0.7)
Smoked			
Never/previously	Referent	Referent	Referent
Currently	0.1 (–0.3 to 0.6)	0.1 (–0.2 to 0.4)	–0.2 (–0.6 to 0.3)

*Defined as total score from L1/2 to L4/5.
†Adjusted for age and sex.
‡Amount of physical activity undertaken at work and home (light, moderate, heavy or very heavy).
§Amount of time typically spent walking or on a bicycle each day (none; some, but <1/2 h; 1/2 – 1 h; >1 h).

The response rate for participation in the study was 61%. Because the analysis of the influence of weight, BMI and lifestyle factors was based on an internal comparison of responders, non-participation is unlikely to have had a major effect on the observed results. Intraobserver agreement levels for assessment of the radiographic features were good ($\kappa =$ 0.7–0.8), and it seems unlikely that random error in scoring the films importantly attenuated the associations. Finally, the results were derived from a predominantly Caucasian population in north-eastern Scotland, and the data should be extrapolated beyond this population with caution. Previous population-based studies examining the effect of regular levels of physical activity and smoking provide somewhat conflicting results.[5 7–9] Our data suggest no important influence of these factors on the occurrence of the individual radiographic features of lumbar disc degeneration. By contrast, increased weight was associated with an increased risk of osteophytes.

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Analysis of response to infliximab in ankylosing spondylitis according to the axial and/or peripheral involvement: autoantibodies and drop outs are more frequent in the peripheral subset

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Infliximab, a monoclonal antibody that targets membrane and soluble tumour necrosis factor (TNF)α, has recently been successfully used to treat patients with active ankylosing spondylitis.[1 2] No distinction in terms of axial or peripheral involvement has ever been considered in evaluating the clinical response and autoantibody induction secondary to the infliximab regimen in patients with ankylosing spondylitis.

In this study, we evaluated the effectiveness and tolerability of infliximab in 23 patients with ankylosing spondylitis with only axial involvement (AS_{axial}) and in 24 patients with ankylosing spondylitis with axial and peripheral arthritis ($AS_{peripheral}$) (Bath Ankylosis Spondylitis Disease Activity Index (BASDAI) $\geq$4),[3] and the occurrence of autoantibody induction[4–7] in the two different subsets and their clinical relevance in terms of outcome. All patients received infliximab (5 mg/kg) according to the standardised regimen and stable doses of disease-modifying antirheumatic drugs (methotrexate 10–20 mg/week). Doses of non-steroidal anti-inflammatory drugs were allowed to be reduced but not increased during the study.

Disease activity was evaluated at baseline and before each consecutive infusion by the use of the BASDAI, erythrocyte sedimentation rate and C-reactive protein (mg/l) serum level. Physical function was evaluated using the Bath Ankylosis Spondylitis Functional Index and Bath Ankylosis Spondylitis Metrology Index. Serum samples were assessed at baseline and every 3 months for the presence of antinuclear antibodies, anti-dsDNA and antiphospholipid (aPL) antibodies. The cut-off concentration for positive antinuclear antibodies titre was 1:160; anticardiolipin was considered positive when above the cut-off level (Ig G >10 GPLU/ml, IgM >10 MPLU/ml). The positive cut-off level for lupus anticoagulant was Tissue Thromboplastin Index>1.25, kaolin clotting time >15 and dilute Russell's viper venom time >36s.

Abbreviations: aPL, antiphoshoipid; AS_{axial}, ankylosing spondylitis with only axial involvement; $AS_{peripheral}$, ankylosing spondylitis with axial and peripheral arthritis; $AS_{negative}$, ankylosing spondylitis without autoantibodies; $AS_{positive}$, ankylosing spondylitis with autoantibodies; BASDAI, Bath Ankylosis Spondylitis Disease Activity Index